NEWS SCIENCE NEWS

TESLA ELECTRICITY GENERATION EXPERIMENT

by Anthony Hansen

Ninety-five years ago, near Colorado Springs, USA, a strange device was connected to the Earth. It was a large electrical machine which, at its highest point, was 167 feet tall. Part of the device was 50 feet in diameter. The complete machine was kept in a wooden building specially made for it.

When the device was switched on, bolts of lightning would jump from a metallic ball 30 inches in diameter and 167 feet from the ground, straight up to the sky. A spectacular demonstration of energy, no doubt it would have impressed the people of Colorado Springs.

The man who designed and built this strange device was Nikola Tesla (1856-1943). Tesla is perhaps best remembered for the AC power system which was first used at Niagara Falls and is now used in virtually every country. He is not well-known for his Colorado experiments.

According to Tesla, the device was constructed to prove his theory that electricity could be taken from the Earth—in other words, a previously unknown source of power could be extracted from the Earth and put to use. It seems that Tesla was successful but the system was never put into use, much to Tesla's disappointment.

It appears that some experimenters did try to build these machines but apparently to no avail. Some even complained to Tesla who usually replied by saying, "Well, it is not my fault if you cannot build my machines; it just means that you are electricians of the ordinary kind." Sometimes he answered by saying anyone who has the same ability as he, can build them. As there are very few people like Tesla, this seemed a formidable task. But after careful consideration it occurred to me that Tesla had left more than enough clues how to build this equipment, and that most of the material necessary to build one of these devices was available.

I then decided that I would attempt to build one of these devices. Now the first thing to do, it seemed, would be to make out a list of materials required. Copper wire and cable, condensers, step-up transformers, mechanisms for breaking or pulsing the system, insulating materials and many other things. There was also the need to decide what length of wire might be necessary to tap into the Earth. Tesla usually wound his coils to quarter wavelengths and stated that a certain length was needed to tune in. If it was shorter, the frequency would be too high and it would be impossible to draw out energy.

Having decided to use a certain length of secondary wire, I then turned to the next consideration which was the size of the secondary. As the length of wire was quite long it was obvious the secondary would be fairly large.

The next problem was capacitors. The ones I needed had to be able to take a great electrical pressure and also have a fairly large storage capacity. These proved to be quite difficult to obtain, or, if they were available, were very expensive. Tesla solved this problem by using champagne bottles. These were arranged side by side in large wooden boxes lined with sheet copper or tin. There was usually 30 to 40 bottles per box. The basic idea was to fill the bottles with a concentrated salt water solution to within a few inches of the top. The salt solution was also surrounding the bottles. When connected up, Tesla had a cheap and very strong capacitor. He also had the use of the champagne and, as he liked entertaining, there were probably quite a few bottles. This seems a wonderful use for champagne bottles. The other advantage was that if the capacitor overloaded, the bottles would burst. It could be said that this was like a fuse blowing and added safety to the system. I have seen modern capacitors blow up, sometimes with spectacular results. I would rather hear a champagne bottle pop inside a box than watch modern oil-filled ones explode.

The overall consideration was what are the basic things required to build a complete system. The list now read as follows:

1—Secondary coil (exact length to be determined)

Tesla in his offices at 8 West 40th Street, New York. (Columbia University Libraries)

The letterhead of Tesla's business stationery, showing the famous Wardenclyffe tower.

2—An elevated terminal capacity for the secondary

3—Primary coil (exact length to be determined)

4—Capacitors (size to be determined)

5—Variable induction (to tune primary)

6—Break mechanism

7—High voltage transformer to charge the capacitors

8—Electrical schematic for above

9—Special Earth connection

After listing the above, it was now time to have a go at costing. It took no time at all to get a figure of $10,000. I felt better after I realised that it was not necessary to spend $10,000 at once—for example, I could buy the copper wire for the secondary and the heavy cable for the primary.

It is worth mentioning here that, as one can see, it is easy to spend considerable amounts of money. Tesla spent huge amounts of money to build the Colorado equipment. The actual amount in 1900 US dollars was approximately US$70,000. The big question was, could tests be done with apparatus that did not cost this much, to prove or discover something? I felt the answer was yes.

CONSTRUCTION

The next step was to build the apparatus. After considerable thought I decided it may be wise to build a slightly smaller machine as a first step. With this I could get an idea of the basics, test the various circuits including capacitors, and see how well I could get one of these devices working.

The first stage was now to build the secondary coil. I was wondering what sort of form to use to wind the wire on, when it occurred to me that the large cardboard cylinders, used in high-rise buildings, etc. when pouring concrete to mould round columns, would be ideal.

I decided to use a cylinder which was 20 inches in diameter and 60 inches long. The cylinder was covered with waxed paper which I carefully peeled off. Underneath was untreated cardboard. I then applied three coats of transformer varnish. The end result was a cardboard cylinder impregnated with an insulating varnish. As the voltages can be very high, it is essential that the cardboard is well treated and cannot catch fire.

The next stage was to wind on the secondary wire. The wire size was 0.5 mm. I wound on 680 turns.

Next was the primary. The primary cable was approximately one inch in diameter and consisted of three inner cables of 9 mm diameter. The primary had three-and-a-half turns.

It was now time to connect in the capacitors. As mentioned previously, Tesla used champagne bottles. However, I decided as a first step to test out some capacitors that I had recently obtained by way of a government auction. These were in fact high-voltage capacitors from an obsolete radar system built in the UK. As I was soon to find out, these were excellent capacitors and have never given any problems.

High-Voltage Transformer

This is an essential part of the system. It charges the capacitors which are then discharged into the primary. The primary then vibrates or quivers electrically at a certain period. The vibrating primary then excites the secondary. This causes a high voltage to be produced in the secondary. The actual voltage that is produced is determined to a degree by the turns ratio, but if the apparatus is tuned correctly the voltage can be much higher. The high-voltage transformer I use has an output of about 10,000 volts.

Capacity for Secondary

The secondary will be more powerful if it has a capacitance connected to the top end. This can result in a considerable charge being stored in the capacitor, which makes for a more efficient system and a more spectacular discharge. The type of capacitor which is commonly used is a hollow copper ball which should be about the same diameter as the secondary.

Air Gap

When the capacitors are storing energy from the high-voltage transformer, the air gap—which may consist of two 25 mm stainless steel balls a certain distance apart—will be bridged by electrical discharges. The frequency of these discharges can be increased or made slower by varying the capacitance or by adjusting the spark gap.

TEST RESULTS

When the apparatus was connected up, it was possible with an input of no more than 50 volts AC to obtain discharges from the secondary terminal of 1.5 to 2 million volts plus. The apparatus can easily produce discharges which will jump a two-metre distance.

With no Earth terminal to discharge to, the secondary terminal produces a purple corona for a distance of two feet around the terminal.

The 50 volts AC which is supplied to the primary of the high-voltage transformer can rise up to 120 volts when the system is energised. I feel this is caused by a back-EMF from the high-voltage coil.

The apparatus also produces ozone as a result of the high voltage discharging through the air.

The apparatus, if pushed to its limit with present adjustments, should be capable of producing at least 5 million volts and probably much more.

SUMMARY

These are considerations only—and only time will tell if energy can be extracted from the Earth.

As stated above, these are theoretical considerations, and any person who wants to use this information does so at his or her own risk as the voltages are very high. Therefore, one has to be cautious.

To be continued...

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JAPANESE SUPER-MAGNET BREAKTHROUGH

An electric car with motors that make their own electricity and cost nothing to run? Sounds like a story from a sci-fi comic.

Yet Japanese inventor Yasunori Takahashi claims to have done just that. Purely by accident he came across a method of making permanent magnets with extraordinary power. Put these magnets in an electric motor and, he claims, it can generate four times its input electricity.

A standard Honda electric scooter, its motor fitted with the magnets, was demonstrated at a hotel in London. The scooter's original heavy lead-acid cells were stripped out and replaced with four small 12-volt batteries.

On the road, the scooter hit 30 mph in around four seconds. The way it was accelerating, 60 mph would have probably come up in eight.

Takeo Sawai, the inventor's UK representative, told us that he took delivery of the scooter, at London Airport, with almost flat batteries and drove it down the M4 at 70 mph. At the end of the journey, he said, the batteries were fully charged.

The scooter has been demonstrated to Nissan, GEC-Marconi and Philips. Apparently the companies are all taking the idea seriously. Emmerson Linfoot, Senior Engineer in the electrical department at Nissan's European Technical Centre, said that the invention, "if it checks out on our own tests...has huge implications for everything which uses a motor—it could revolutionise the world".

In November, a Mercedes will be fitted with four of the motors. It will, claims Sawai, have performance like a petrol car—but with virtually unlimited range and almost no fuel costs.

Yasunori Takahashi has spent £3 million on his invention, and his company, Sciez, has taken out worldwide patents on the magnet which he will manufacture. The magnets will be supplied under licence to interested companies.

Mr Takahashi says he is not at all interested in making money, only in winning the Nobel Prize, adding: "When tiger dies he leaves his skin. When man dies he leaves his name."

However, scientists we talked to rubbished the invention, saying it defied the first law of thermodynamics."

(Source: Space Energy Journal, vol. v, no. 4, December 1994)

FOSSIL FORESTS IN ANTARCTICA

Australian and American scientists have uncovered fossil evidence of leaves, wood, pollen, moss and insect eggs only 500 km from the South Pole in sheltered valleys of the Transantarctic Mountains. The fossil finds have sparked worldwide scientific controversy over the speed and extent of global climate change—and speculation over when Antarctica was last ice-free.

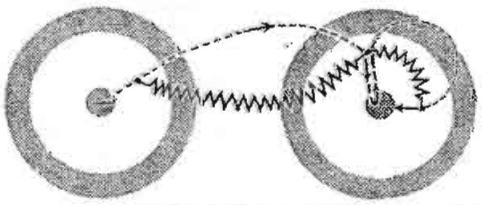
Dr Barrie McKelvey, of the University of New England, NSW, found plant specimens in the windswept, rocky Meyer desert. These have been classified by Prof. Bob Hill of Tasmanian University as members of the *Notofagus* or southern beech family, still widespread in southern Australia (particularly alpine Tasmania), South America and New Zealand.

What's more, beetle eggs were found amongst the plant material, indicating a climate warm enough for insects. According to Prof. Hill, the climate had to have been at least 25°C warmer than it is today for woody plants to exist; there had to have been liquid water and a growing season to allow plants to flower and seed to be set and sown.

As for the age of the plants, some scientists argue at least 14 million years; others, between 2.5 and 3 million years. The latest theory is from Prof. David Harwood of Ohio State University who discovered fossil marine diatoms in the same layers as the plants. As these species didn't appear until approx. 3.8 million years ago, he argues that this puts an upper limit on the age of the plant-bearing rock.

Dr McKelvey believes that the Antarctic ice-cap melted completely around that time, leaving the continent fringed with vegetation and covered with shallow, diatom-rich seas—later gouged out by encroaching ice 2.5 million years ago.

(Source: Julian Cribb, The Australian, 2 August 1994)



NEW FRONTIERS WORKSHOPS

"This is a turning point. The world will not be the same after this international meeting!" says Australian mathematician/theoretical physicist, Prof. Chris Illert, of the upcoming "New Frontiers in Clean Hadronic Energy" workshop in Italy. The buzz?—the theory predicting novel sources of subnuclear hadronic energy (see diagram above) is be demonstrated with new technology purpose-built to tap this energy.

Chris Illert is co-ordinating "New Frontiers in Theoretical Biology", one of six workshops to be held at the Institute for Basic Research Conference at the Monteroduni Institute, Italy, 7-13 August. The other "history-making" workshops are: multi-valued hyperstructures, integro-differential geometries, particle physics, gravitation, and superconductivity.

For further information and bookings, contact Chris Illert, East Corrimal, NSW, Australia, ph/fax +61 (042) 83 3009. For dhadronic energy workshop details, contact IBR, Florida, USA, fax +1 (813) 934 9275 (to 15 May); or co-ordinator, Prof. R. M. Santilli, Istituto per la Ricerca di Base, Monteroduni, Italy, fax +39 (865) 49 1145.